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SEQUENTIAL EVALUATION OF THE WECHSLER ADULT INTELLIGENCE SCALE.

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DIFFERENCES WERE STUDIED AMONG NEUROTIC AND SCHIZOPHRENIC PERFORMANCES, ELICITED BY THE WECHSLER-BELLEVUE ADULT INTELLIGENCE SCALE (PICTURE ARRANGEMENT SUBTEST). TWO GROUPS OF 40 ABNORMAL ADULT SUBJECTS WITH INTELLIGENCE QUOTIENTS BETWEEN 84 AND 116 WERE TESTED. ONE-HALF OF THE SUBJECTS WERE SCHIZOPHRENIC. SUBJECTS WERE REQUIRED TO ARRANGE CARDS IN SEQUENCE. SUBJECTS' PERFORMANCES WERE EVALUATED BY FREQUENCIES OF SELECTION IN GIVEN POSITION SEQUENCES, REPORTED IN EARLIER STUDIES (ED 003 005, ED 003 006, AND ED 003 007). WHEN SUBJECT RESPONSES WERE INCORRECT, ACCORDING TO WECHSLER-BELLEVUE CRITERIA, NO DISCERNIBLE PATTERN WAS NOTICED FOR EITHER GROUP. THE FINDINGS INDICATED THAT ONE SEQUENCE (SERIES 5) DISCRIMINATED MOST SHARPLY BETWEEN PSYCHONEUROTICS AND SCHIZOPHRENICS. SERIES 5 WAS THE SEQUENCE USED MOST FREQUENTLY BY BOTH GROUPS TO RESPOND CORRECTLY. DETAILED RESULTS OF SERIES 5 PERFORMANCES WERE PRESENTED. PSYCHONEUROTICS DEMONSTRATED MORE CONSISTENT PERFORMANCE THAN SCHIZOPHRENICS. SUGGESTIONS FOR PERFORMING A SIMILAR COMPARISON FOR NORMAL SUBJECTS WERE ADVANCED. (WN)

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The writer also wishes to thank Dr. Frank J. Kobler who supplied the records of the subjects used in this study.

The purpose of this study was to investigate differences in performance between neurotics and schizophrenics in the Picture Arrangement Subtest of the Wechsler-Bellevue Intelligence Scale. For our purposes, this subtest has a special interest since subjects are required to arrange the cards in sequence.

The two groups used in this study consist of 40 abnormal subjects, 20 psychoneurotics and 20 schizophrenics (1) with I.Q.'s between 84 and 116. The mean and standard deviation of the I.Q.'s and the ages of each group are shown in Table 1.

TABLE 1

Means and Standard Deviations for the Two Groups

N = 20	I.Q.		Age	
	M.	σ	M.	σ
Neurotics	102.75	7.30	30.05	12.06
Schizophrenics	101.35	8.30	26.20	8.07

The method used in this study (Rimoldi, 1961; Rimoldi and Haley, 1962) evaluates a subject's performance by considering the frequency with which an item is selected in a given order in the sequence.

Series 1, 2, and 3 of the Picture Arrangement Subtest were answered correctly by 90% of the subjects. In series 4 the most frequent arrangement chosen was the sequence "JNAET". The percentage of subjects who answered this part of the test according to any of the Wechsler-Bellevue criteria was 80% for the neurotic group and 55% for the schizophrenic group. In series 5

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(1) Selected from Loyola University's records of abnormal subjects.

the neurotics selected most frequently the order "SAMUEL", and the schizophrenics "SALMUE". In the psychoneurotic group 75% of the subjects obtained at least one of the six possible arrangements described by Wechsler as compared to 55% of the schizophrenic group. Twenty per cent of the psychoneurotics obtained the maximum credit (SAMUEL) against 5% of the schizophrenics. The psychoneurotics' incorrect answers do not show any noticeable arrangement, but the schizophrenics seem to follow the sequence "AMUELS". In series 6 the arrangement "EFGHLJ" was selected more frequently by the two groups. Forty per cent of the psychoneurotics and 60% of the schizophrenics answered according to the Wechsler-Bellevue criteria. When the answer was incorrect there was no discernible pattern for either group.

From these findings it was concluded that series 5 discriminates more sharply between psychoneurotics and schizophrenics. This differentiation was evident both in the sequences followed in selecting the cards and in the percentage of subjects answering correctly. For this reason only the performance in series 5 will be discussed in the present study.

TABLE 2

Frequency of Responses to Each Card in Every Order

a. Psychoneurotics

Order \ Cards	S	A	M	U	E	L	Σ
1	18		2				20
2		18			2		20
3			8	2		10	20
4		2	4	7	6	1	20
5	1			7	11	1	20
6	1		6	4	1	8	20
Σ	20	20	20	20	20	20	120

b. Schizophrenics

Order \ Cards	S	A	M	U	E	L	Σ
1	14	5		1			20
2	1	14	5				20
3			2	4	3	11	20
4			5	4	9	2	20
5		1		7	8	4	20
6	5		8	4		3	20
Σ	20	20	20	20	20	20	120

The subjects' responses are shown in Tables 2a and 2b, where the columns indicate cards and the rows, order of selection. Had all the subjects followed the order "SAMUEL" the matrix of responses should be diagonal and with the same value throughout.

The frequency of responses which appear in Tables 2a and 2b were converted into proportions to indicate the percentage of responses for each card in each order. These proportions are presented in Tables 3a and 3b.

TABLE 3

Proportions of the Total Responses Corresponding to Each Card in Every Order*

a. Psychoneurotics

Order \ Cards	S	A	M	U	E	L	Σ
1	.150		.017				.167
2		.150			.017		.167
3			.067	.017	.083	.083	.167
4		.017	.033	.058	.050	.008	.167
5	.008			.058	.092	.008	.166
6	.008		.050	.033	.008	.067	.166
Σ	.166	.167	.167	.166	.167	.166	1.00

b. Schizophrenics

Order \ Cards	S	A	M	U	E	L	Σ
1	.117	.042		.008			.167
2	.008	.117	.042				.167
3			.017	.033	.025	.092	.167
4			.042	.033	.075	.017	.167
5		.008		.058	.066	.033	.165
6	.042		.066	.033		.025	.166
Σ	.167	.167	.167	.165	.166	.167	1.00

* The differences in the sum is due to the effect of rounding.

Table 4

Expected Proportions According to the Wechsler-Bellevue Criteria

Order \ Cards	S	A	M	U	E	L	Σ
1	.167						.167
2		.167					.167
3			.167				.167
4				.167			.167
5					.167		.167
6						.167	.167
Σ	.167	.167	.167	.167	.167	.167	1.00

A similar operation was performed for the values expected in terms of the "best" order suggested by Wechsler (Wechsler, 1944), that is, "SAMUEL". These proportions are given in Table 4.

Tables 5 and 6 show respectively the sequences followed by psychoneurotics and schizophrenics. The first column presents the score according to the Wechsler-Bellevue criteria. The second, the different arrangements that were observed, and the third column the subjects that followed the indicated sequence. In the fourth column the sum of the observed proportions as obtained from Tables 3a and 3b are given. In the last column the sum of the differences between observed and expected proportions are accumulated for each sequence. The expected proportions are the values presented in Table 4. The observed proportions are obtained in Table 3a for psychoneurotics and 3b for schizophrenics.

TABLE 5

Sequences Followed by the Psychoneurotics

Score	Sequence	Subjects	ΣP_o	$\Sigma(P_o-P_e)$
3	SAMUEL	4, 8,10,16	.584	-.418
2	SAMEUL	12,15,19	.542	-.126
1	SALEUM	5, 7	.541	.207
1	SALMEU	9,18	.541	.040
1	SALMUE	2	.482	.148
1	SALUEM	14,17,20	.583	-.085
0	SAUMEL	13	.509	-.159
0	MELASU	1	.175	.175
0	SAMELU	3	.458	-.043
0	MELAUS	6	.200	.200
0	SAULEM	11	.467	-.034

Table 6

Sequences Followed by the Schizophrenics

Score	Sequence	Subjects	ΣP_o	$\Sigma(P_o-P_e)$
3	SAMUEL	4	.375	-.625
1	SALEUM	2, 3, 7,11,13	.525	.191
1	SALMEU	10,18	.467	-.034
1	SALUEM	6, 8,16	.491	-.177
0	UMELAS	1	.142	.142
0	AMELUS	5	.226	.226
0	SAUMEL	9	.400	-.267
0	SAEMUL	12	.384	-.117
0	ASLMEU	14	.283	.116
0	AMUELS	15,17,20	.267	.267
0	SAMELU	19	.392	-.109

Figure I represents the responses of each neurotic subject in terms of his own group. On the abscissa, the order of selection is indicated. On the ordinate, cumulative proportions are given. The solid line represents the responses of the subject in terms of his own group obtained by cumulating the values in Table 3a and the broken line represents the difference between observed and expected proportions (P_o-P_e) as given in Tables 3a and 4. The special sequence under consideration is given at the end of each curve.

If the observed performance of the group agrees with the expected performance, then the differences between observed and expected value should be 0 or around zero considering the effects of errors. Thus the broken line should be at the 0 value for the ordinate. Any departure of the observed from the expected performance will show a positive or negative deviation from the 0 line.

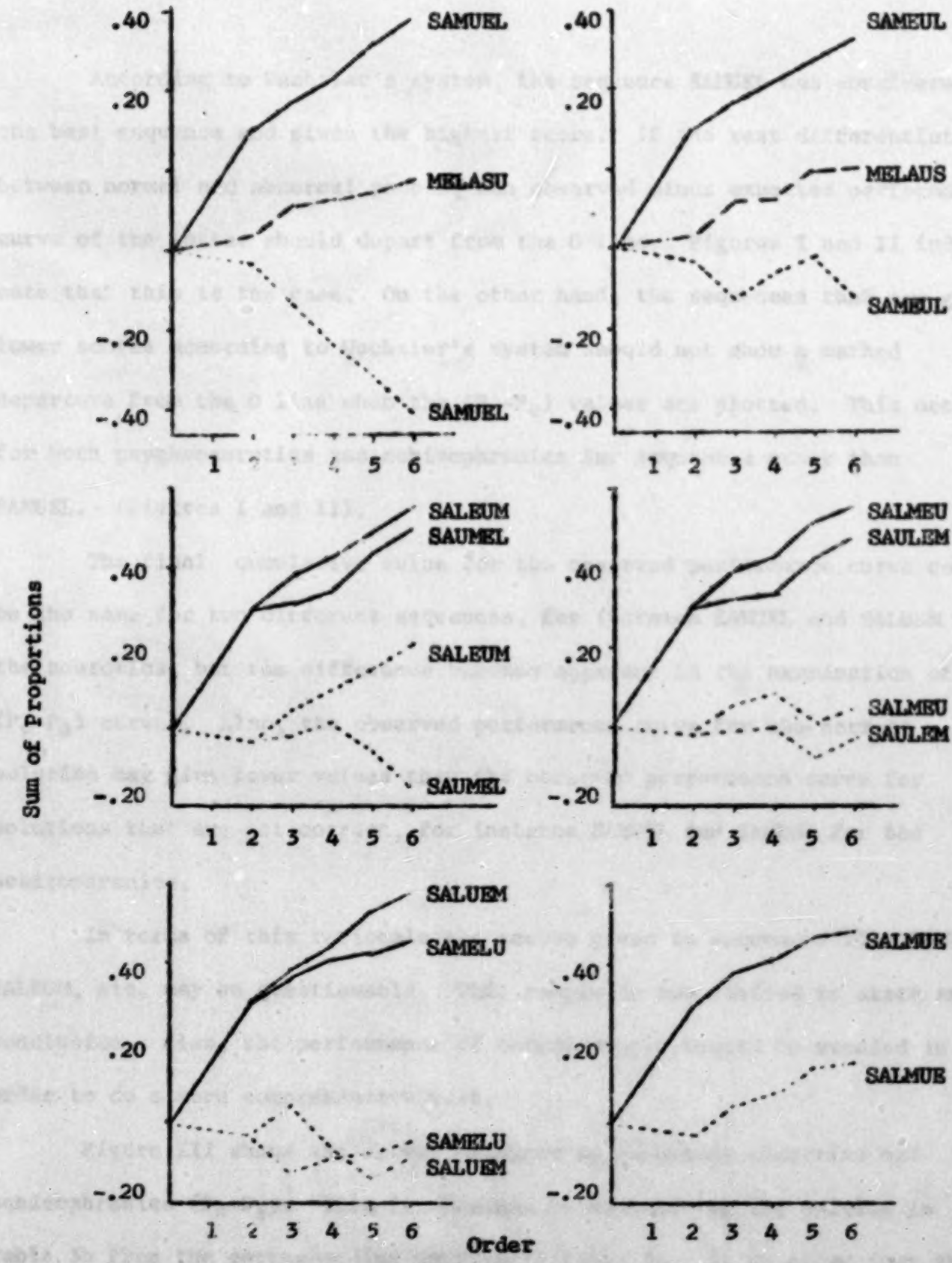

Figure I

Performance Curves of Psychoneurotic Subjects

——— (P_o) - Responses of Psychoneurotic subjects in terms of his own group (Cumulative proportions Table 3a)

----- (P_o-P_e) - Difference between observed and expected proportions (Table 3a - Table 4).

— — (P_o) = (P_o-P_e)

According to Wechsler's system, the sequence SAMUEL was considered the best sequence and given the highest score. If the test differentiates between normal and abnormal people, the observed minus expected performance curve of the latter should depart from the 0 line. Figures I and II indicate that this is the case. On the other hand, the sequences that are given lower scores according to Wechsler's system should not show a marked departure from the 0 line when the (P_o-P_e) values are plotted. This occurs for both psychoneurotics and schizophrenics for sequences other than SAMUEL. (Figures I and II).

The final cumulative value for the observed performance curve can be the same for two different sequences, for instance SAMUEL and SALUEM in the neurotics, but the difference becomes apparent in the examination of the (P_o-P_e) curves. Also, the observed performance curve for the correct solution may give lower values than the observed performance curve for solutions that are not correct, for instance SAMUEL and SAUMEL for the schizophrenics.

In terms of this rationale the scores given to sequences like SAMEUL, SALEUM, etc. may be questionable. This sample is too limited to state any conclusion. Also, the performance of normal people should be studied in order to do a more comprehensive test.

Figure III shows the curves obtained by comparing neurotics and schizophrenics (P_n-P_s). This is obtained by subtracting the entries in Table 3b from the corresponding entries in Table 3a. It is clear that the sequence SAMUEL is the one that shows a greater difference between neurotics and schizophrenics, followed by SAMEUL, SALUEM, SALMEU, SALMUE, and SALEUM in that order.

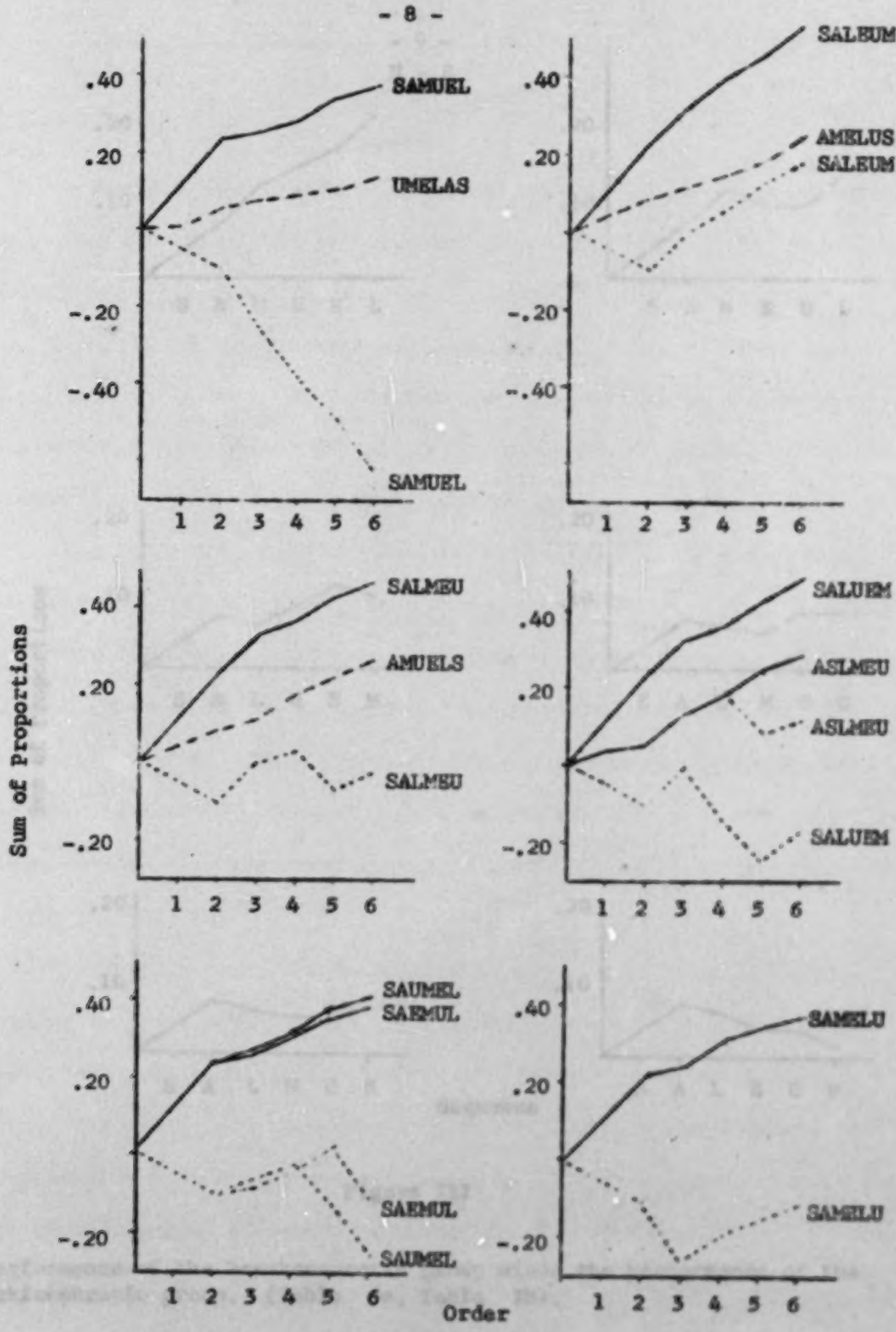

Figure II

Performance Curves of Schizophrenic Subjects

——— (P_o) - Responses of Schizophrenic subjects in terms of his own group (Cumulative proportions Table 3b)

----- (P_o-P_e) - Difference between observed and expected proportions (Table 3b - Table 4)

— — (P_o) = (P_o-P_e)

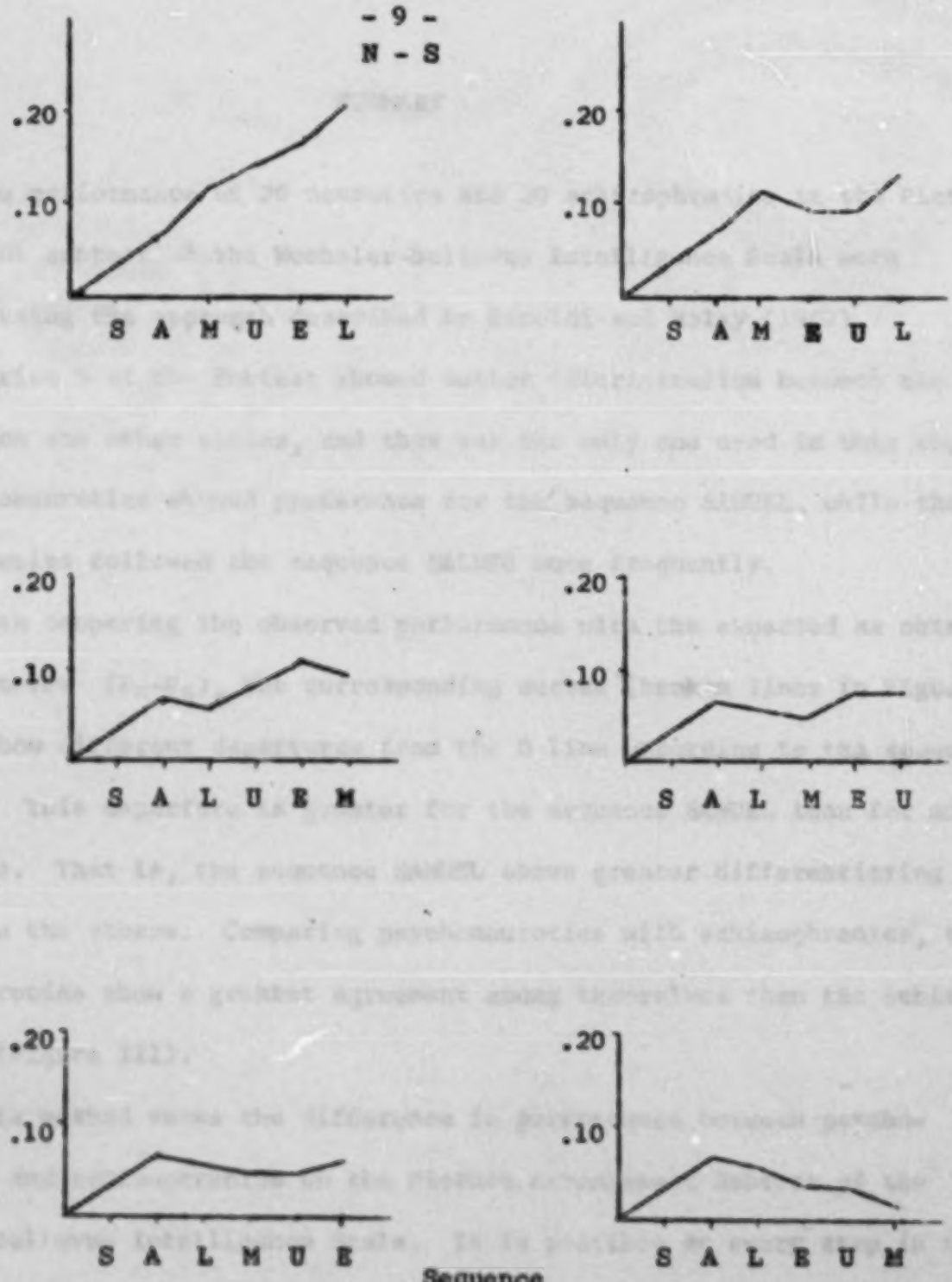

Figure III

Performance of the Psychoneurotic group minus the performance of the Schizophrenic group. (Table 3a, Table 3b).

SUMMARY

The performance of 20 neurotics and 20 schizophrenics in the Picture Arrangement subtest of the Wechsler-Bellevue Intelligence Scale were examined using the approach described by Rimoldi and Haley (1962).

Series 5 of the Subtest showed better discrimination between the groups than the other series, and thus was the only one used in this report. The psychoneurotics showed preference for the sequence SAMUEL, while the schizophrenics followed the sequence SALMEU more frequently.

When comparing the observed performance with the expected as obtained from the norms (P_o-P_e), the corresponding curves (broken lines in Figures I and II) show different departures from the 0 line according to the sequence analyzed. This departure is greater for the sequence SAMUEL than for any of the others. That is, the sequence SAMUEL shows greater differentiating power than the others. Comparing psychoneurotics with schizophrenics, the psychoneurotics show a greater agreement among themselves than the schizophrenics (Figure III).

This method shows the difference in performance between psychoneurotics and schizophrenics on the Picture Arrangement Subtest of the Wechsler-Bellevue Intelligence Scale. It is possible at every step in the process to identify how each subject proceeds. The curves indicate that schizophrenics have a more erratic behavior than psychoneurotics. It would be of great interest to perform the same comparison using records of normal subjects.

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